



# National Transportation Safety Board

Washington, D.C. 20594

## Safety Recommendation

Log m-354

Date: August 8, 1989

In reply refer to: M-89-43 through -51

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Commandant  
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Washington, D.C. 20593

About 2325 on March 15, 1988, a fire occurred in the engineroom of the Bahamian flag passenger vessel SCANDINAVIAN STAR. At the time of the fire, the ship was about 50 nmi northeast of Cancun, Mexico, en route from Cozumel, Mexico, to St. Petersburg, Florida, with 439 passengers and 268 crewmembers on board. The master broadcast a distress message and ordered the evacuation of passengers to the four muster stations on the ship. The loss of main generator and emergency generator electrical power and the malfunction of the ship's fixed CO<sub>2</sub> firefighting system hindered efforts to fight the fire. The inability of crewmembers to communicate with each other and with passengers created confusion during the firefighting and evacuation activities. Two crewmembers received minor injuries during the emergency. Two passengers were medivaced from the vessel and flown to a hospital in St. Petersburg, Florida, where they were treated and later released. Damage and repair costs were estimated at \$3.5 million.<sup>1</sup>

The investigation revealed that the electrical power supply for the emergency generator did not comply with International Maritime Organization (IMO) or Coast Guard regulations that require the emergency generator be independent and separated as far as practical from the main machinery spaces to ensure that "a fire or other casualty in spaces containing the main source of electrical power...will not interfere with the supply, control, and distribution of the emergency electrical power." Testimony by the chief electrician and engineering officers revealed, however, that the battery bank which supplied power to excite the magnetic field in the emergency generator was located in the main engineroom.

<sup>1</sup>For more detailed information, read Marine Accident Report--"Fire On Board the Bahamian Passenger Ship the SCANDINAVIAN STAR in the Gulf of Mexico, March 15, 1988" (NTSB/MAR-89/04).

For approximately 1 hour while the vessel was under emergency battery power, passengers received no direct communication from the master regarding the ongoing emergency. Passenger statements indicate that at times they were provided inaccurate and incomplete information by crewmembers as to what action to take during the emergency. For example, some passengers returned to their cabins through the smoke to obtain their lifejackets; they apparently did not know that lifejackets were also stowed on deck. Although fortuitously there were only minimal injuries as a result of the fire emergency on board the SCANDINAVIAN STAR, the Safety Board is concerned that with the lack of direct communication to passengers at all times during an ongoing emergency, the possibility of mass confusion, panic, and hysteria exists.

A number of factors hampered the successful evacuation of passengers to the muster stations. Although the master was able to stop the ventilation system to the passenger accommodations, all of the ship's ventilation fans and vent dampers were not closed immediately after the fire was discovered and, as a result, smoke quickly spread to the public spaces such as the lounge, passageways and stairwells, and to the two aft muster locations. Passengers stated that the Gasparilla Lounge quickly filled with smoke through the airconditioning ducts. Had the ventilation systems been stopped when the fire was initially discovered, the migration of smoke would not have been as extensive as it was, and some of the problems of reduced visibility and breathing difficulties while searching for and evacuating passengers could have been avoided.

The Safety Board has previously addressed the need to stop ventilation immediately upon detection of a fire. As a result of its investigation of the fire aboard the SCANDINAVIAN SUN, the Safety Board recommended that the Coast Guard:

M-85-57

Direct inspectors conducting control verification examinations to stress to the ship's officers the need to close fire doors and to stop ventilation immediately upon detection of a fire.

In response, the Coast Guard indicated that the marine safety manual had been revised to instruct marine inspectors to question the crew about their emergency duties. According to the Coast Guard, this should ensure that the crew is aware of what prompt and effective action needs to be taken in the event of fire. Although this safety recommendation was placed in a "Closed--Acceptable Action" status, the Safety Board believes that this accident illustrates that further guidance to crewmembers is needed on this issue. The Safety Board believes that at a minimum the need to stop ventilation in the event of a fire should be stressed in the ship Emergency Plan and in the emergency firefighting procedures for the machinery spaces.

Notwithstanding the Board's belief that crewmembers should be aware of the need to shut down ventilation systems in the event of an emergency, the Safety Board believes that with the state-of-the-art technology, ventilation

systems could be automatically stopped, thus preventing the migration of smoke as occurred during the evacuation of passengers in this accident. Smoke-sensitive actuating devices that would automatically shut down the ventilation system when the smoke sensing device is actuated could be made a part of each local ventilation system.

The Safety Board has recognized previously that the automatic shutdown of the ventilation system would reduce the amount of smoke spread through the ship. As a result of the Safety Board's investigation of the fire and explosion on board the passenger ship EMERALD SEAS in the Atlantic Ocean near Little Stirrup Cay, Bahamas, on July 20, 1986, the Safety Board made the following safety recommendation to the Coast Guard:

M-87-18

Propose that the International Maritime Organization amend SOLAS 74 to require that smoke detectors be made a part of each local ventilation system to shut down the ventilation system automatically when the detector is activated to prevent the spread of smoke.

The Coast Guard forwarded this recommendation to the IMO's Maritime Safety Committee as a United States agenda item and in the 33rd session of the Subcommittee on Fire Protection it was introduced. The United States stated in this document that in the past, smoke detectors were not technically advanced. Today, cost, reliability, and accuracy have improved to the point that dampers and fans can be successfully controlled through local smoke detectors; therefore, the United States proposed that the Subcommittee consider amending SOLAS 74 regulation II-1/16 and 32 by adding the following sentences:

.1 To the end of paragraph 1.6 add the following sentence:

"Smoke detectors shall be installed in ventilation ducts, and shall be connected to the power ventilation controls so as to automatically stop all fans in case of fire."

.2 Add a new paragraph 1.7:

"1.7 All automatic fire dampers shall be equipped with smoke detectors arranged to close the damper in case of fire."

Discussion was held at the 34th session and the issue of amending SOLAS 74 to require automatic ventilation system shutdown was supported in the working group on passenger vessel safety by Japan, Finland and the United States. However, a larger number of Administrations, most notably the United Kingdom, Canada, Russia, Liberia, Sweden, Norway and the Netherlands, opposed the amendment citing the fact that human failure led to delays in ventilation systems shutdown and that there may be cases such where shutdown may be dangerous, i.e., if passengers are trapped in a smoked situation.

The Safety Board, however, continues to be concerned that automatic ventilation system shutdown is not a requirement for foreign flag passenger vessels entering the U.S. cruise industry market. In view of the fact that the safety recommendation met with little success through the IMO process, the safety recommendation has now been placed in a "Closed--Superseded" status. As an alternative approach, the Safety Board believes that the Coast Guard should seek legislation that directs U.S. and foreign flag passenger vessels operating out of ports in the U.S. to have automatic ventilation system shutdowns.

During the accident, there was evidence of language barrier problems on board the SCANDINAVIAN STAR. The Honduran watch motorman communicated by hand signals to the Filipino watch engineer that there was a fire in the engine room. Since the two crewmen did not share a common language, the use of hand signals was the only means available for communicating. While there is no evidence to suggest that the watch engineer had difficulty deciphering the hand signals of the motorman, the Safety Board remains concerned that the watch crewmen, who are responsible for monitoring the machinery spaces and initiating a timely response to any emergency situation, did not share a common language. Had a situation developed that required the exchange of more complex information, any delay in communicating this information could become critical and further endanger the lives of passengers and other crewmembers. The Safety Board believes that watchstanders should be able to communicate in a common language during normal and emergency situations and that requirements to reduce language barriers should be established.

The investigation revealed further that neither the Filipino engineer or any other engineering or deck officer read French, but that nearly all of the machinery and equipment operating manuals and engineering drawings were written in French. Both the chief engineer and the staff engineer testified that they did not know that the purpose of the deflector sleeve on the packing gland was to prevent leaking fuel oil from contacting hot ignition surfaces. Even though the manuals did state in French the purpose of the deflectors, it is unknown if the crewmen would have replaced them had the manuals been written in a language they could read and understand. Nevertheless, the Safety Board questions the usefulness of having manuals written in a language that is not understood by the ship's operating and maintenance personnel. More importantly, the Safety Board is concerned that SeaEscape Ltd. was probably aware that engineering instructions and drawings were written in a language not understood by the ship's officers.

Postaccident statements by passengers, the majority of whom spoke English, indicated that there were numerous problems during the emergency communicating with the crew, which consisted of 27 different nationalities, many of whom could not speak or understand English. Passenger statements also indicate that crewmembers did not understand each other and, as a result, firefighting and evacuation activities were at times confusing and instructions were given through gestures. The Safety Board is concerned that acceptable levels of safety for passengers and crewmembers may be compromised if passengers and crewmembers are unable to communicate without difficulty, particularly during an emergency situation. The Safety Board

believes that crewmembers in charge of muster and lifeboat stations and the evacuation group should have the ability to communicate in a common language with the majority of the passengers.

Although the Bahamian Shipping Act stipulates language requirements for crews of Bahamian flag vessels, there apparently are no provisions to determine that the requirements are adhered to. Lloyd's Register of Shipping does not inspect crews to determine their competency in the English language and has not been charged to do so by the Bahamian government. Likewise, the Coast Guard does not inspect crews to determine their ability to communicate with each other. Consequently, the Safety Board believes there is a need for the ship's officers and crew to be able to communicate with each other and with passengers.

The investigation revealed that under SOLAS regulations, the Coast Guard's examination of foreign flag vessels is limited in scope and not comparable to the Coast Guard inspections of U.S. passenger vessels. Regulation 19 of SOLAS '48 permits the Coast Guard to board the passenger vessel and "verify that a valid Passenger Ship Safety Certificate is on board;" except for cause, it does not specifically allow the U.S. or any other "country state" to examine in detail a vessel's safety and life saving systems and equipment. Because of the limited scope of the Coast Guard Control Verification Examinations of foreign flag passenger vessels, the Coast Guard examination did not detect the problems with the SCANDINAVIAN STAR's fixed CO<sub>2</sub> firefighting system or with the emergency generator. The Safety Board has expressed concern previously that the Coast Guard examination program for foreign flag passenger vessels that board U.S. citizens at U.S. ports does not measure adequately the level of safety on board foreign passenger vessels.

As a result of its investigation of a fire aboard the SCANDINAVIAN SEA on March 9, 1984, the Safety Board issued the following safety recommendation to the Coast Guard:

M-85-31

Under the Control Verification Program for foreign passenger ships calling at United States ports and embarking U.S. citizens as passengers, conduct more comprehensive examinations of the fire and emergency equipment and safety procedures aboard vessels.

The Coast Guard in response to this recommendation stated that it had taken a number of actions to emphasize its posture on foreign vessel inspections including reinstating its quarterly reexamination program. The Coast Guard also published a navigation and inspection circular which "provides plan review and inspection guidance for operators of foreign passenger vessels calling at U.S. ports for the first time." Based on this information, the safety recommendation was placed in a "Closed--Acceptable Action" status. The Safety Board believes that this accident illustrates that additional action by the Coast Guard is needed in this area. In particular, the Safety Board believes that the testing of only 1 out of 60

alarms in the machinery spaces is unacceptable. In view of the number of foreign flag passenger vessels now calling at U.S. ports and with the expected increase in the number of passenger cruise ships, the Safety Board believes that the Coast Guard should be conducting more detailed inspections of these vessels.

The examination booklet used by Coast Guard inspectors during their control verification examinations was issued in 1981 and has not been revised since that date. The Coast Guard apparently depends on its inspectors to take the initiative to update their booklets manually to reflect amendments to SOLAS conventions that have been adopted since 1981. The Safety Board is concerned that the Coast Guard cannot be assured that all of its inspectors have manually updated their booklets to reflect accurately and consistently all amendments to SOLAS conventions.

Therefore, the National Transportation Safety Board recommends that the U.S. Coast Guard:

Seek legislative authority to regulate and directly surveil the safety of foreign passenger vessels as a condition for operating from U.S. ports. (Class II, Priority Action ) (M-89-43)

Seek legislative authority to require that all passenger vessels operating from U.S. ports embarking U.S. passengers integrate smoke detectors into local ventilation systems to shut down the ventilation system automatically when the detector is activated to prevent the spread of smoke. (Class II, Priority Action) (M-89-44)

Propose that the International Maritime Organization amend SOLAS '74 requirements for passenger vessels to:

Specify the procedures necessary to perform a functional test of fixed CO<sub>2</sub> fire extinguishing systems annually to verify their operation. (Class II, Priority Action) (M-89-45)

Require that operating instructions and engineering drawings for vital ship machinery and emergency equipment be written in a language which is readily understood by the ship's officers. (Class II, Priority Action) (M-89-46)

Require that the emergency battery system supply power for the smoke detection devices, the fire alarms, and the public address system. (Class II, Priority Action) (M-89-47)

Expand the scope of Control Verification Examinations of foreign flag passenger vessels to include a more detailed examination of fire detection and fixed fire extinguishing systems and emergency power systems. (Class II, Priority Action) (M-89-48)

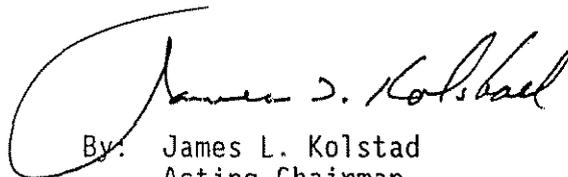
Direct U.S. Coast Guard inspectors conducting Control Verification Program examinations of foreign flag passenger vessels to verify that the emergency generator is independent and not reliant on a power source from the main engine room. (Class II, Priority Action) (M-89-49)

Revise the Foreign Vessel Control Verification Examination booklet (CG-840F) to be current with the SOLAS Conventions and Amendments. (Class II, Priority Action) (M-89-50)

Inform the masters and operators of all passenger vessels operating under the Coast Guard's Control Verification Program, by appropriate published means, of the circumstances and deficiencies in this accident. (Class II, Priority Action) (M-89-51)

Also, the Safety Board issued Safety Recommendations M-89-52 through -65 to SeaEscape; M-89-66 and -67 to Lloyd's Register of Shipping; and M-89-68 to Bureau Veritas.

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.

  
By: James L. Kolstad  
Acting Chairman